RANDOLPH, TONYA

From: RANDOLPH, TONYA

Sent: Monday, April 06, 2015 8:43 AM

Subject: FW: Boring & Construction Logs for West Vermont

Attachments: WES6_thru_WES9_Construction_Logs.pdf; WES-6_through_WES-9_Boring_Logs.xls;

LayneWellsMap.pdf

From: Anderson, Carmen

Sent: Thursday, April 02, 2015 9:00 AM **To:** OSBORN, DIANE; JAWORSKI, MARK

Subject: FW: Boring & Construction Logs for West Vermont

Carmen Anderson

Senior Environmental Manager Remediation Services Branch Office of Land Quality Indiana Department of Environmental Management 100 N. Senate Avenue, IGCN N1101 Indianapolis, IN 46204-2551 canderson@idem.in.gov (317) 234-2513

From: Beodray, Frank [mailto:Frank.Beodray@WestonSolutions.com]

Sent: Wednesday, March 26, 2014 9:48 AM

To: Anderson, Carmen **Cc:** lam.shelly@epa.gov

Subject: Boring & Construction Logs for West Vermont

Hi Carmen, Shelly is responding to an oil spill in Ft. Wayne this morning so she asked me to send you this information in preparation for your meeting with Mundell. I included our field notes on well construction showing lithology and where we placed our screens above the upper till and in the lower sand/gravel layer above the lower till. I also included the boring logs for WES-6- WES-9 and a location map showing where our cluster well locations were placed.

Let me know if there is anything else you need for your meeting.

Frank L. Beodray, CPG

Ohio Operations, Cleveland Office Manager

Weston Solutions, Inc.

Building 2, Suite I 6779 Engle Road Middleburg Hts., Ohio 44130

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GEOLIS Vereion 2.0 SEPT 1994 G050994

GEOLIS, Well Construction Form COMPANY: LOCATION ID: PROJECT: DATE: LOGGER: Michigan HUE W SIGNATURE: 2012 SURVEYED ELEVATIONS (MSL) START DATE: WES-60 16.69 FT/M(TOC) 2 COMPLETION DATE GROUND LEVEL: WES-65 17.35 FT/M(TOC) WELL STATUS: PMP - ABN - COL - NOR MEASURING POINT: (TOP OF CASING) STATUS DATE: WELL TYPE: (SCREEN) MULT. SCREEN - OPEN HOLE - NESTED - PROBE - LYSIMETER DEPTH WELL WELL DIAGRAM - NOT TO SCALE CASING: SINGLE - DOUBLE - TRIPLE COMPLETION: (FLUSH) PROT - VAULT - CAP - NA (FT, BGS) CODE NUMBER OF SCREENS OR NESTED WELLS: (1) 2-3-4-5-OTH: _ WFS-65D WELL USE: DOM - PUB - IRR - FIR - MON HYD - EXT - DEW - RCH - VEW - INJ - OTH: WELL DESIGN CONSTRUCTION GAS 0 INCM INTERVAL: CASING #1: DIAMETER: SCHEDULE: 5-10-20 40 80 -TYPE: PVC STN - LCS - GAL -CASING JOINTS: FLT - BUT - EUT - SOL - WLD - SCW - CAM - OTH: -11 CASING #2: DIAMETER: _ INCM INTERVAL: _ TYPE: PVC - STN - LCS - GAL -_ SCHEDULE: 5-10-20-40-80-10 CASING #3: INCM INTERVAL: _ TYPE: PVC-STN-LCS-GAL- SCHEDULE: 5-10-20-40-80-_ FT/M OUTER CASING: _ STICK UP: SHITTEL GROUT: CMT (C/B) BEN - HSB - OTH: SAND FT/M BGS PLACEMENT: TRM - PRS (GRV) CENTRALIZERS: NON) 1-2-3-0TH: Gravet FT/M BGS SAND PACK: FTM BGS lop lill SCREEN: DIAMETER: 33.7 PVC) STAINLESS - TEFLON - CERAMIC - OTH: CONTINUOUS - SLOTTEDHORIZ - SLOTTED/VERT - FIELD CUT SLOTS: SLOT SIZE: 8 (10)-20 - 30 - 40 SLOT SILT TRAP/SUMP: screen OPEN HOLE: DIAMETER 1:_ INCM INTERVAL: DIAMETER 2: INCM INTERVAL: 50 COLLAPSE/BACKFILL: COL - BFL - BTH - NON INSIDE WELL T.D.: COLLAPSE INTERVAL: TILL 4 BACKFILL INTERVAL: 60. unt STRAT UNIT MONITORED: SAA ESTIMATED WELL YIELD: DRAWDOWN: FT/M BMP GPM/LPM WELL PUMPS: YES - NO TYPE 1: DEPTH: FT/M BMP TYPE 2: WELL CONSTRUCTION CODES - GROUND BURFACE TRC - TOP OF BCREEN BPC - BOTTOM OF PROTECTIVE CASING TOT - TOP OF BILT TRAP TBB - TOP OF SENTONITE SEAL WTD - TOTAL DEPTH INSIDE WELL BTD - BOREHOLE TOTAL DEPTH TBR - TOP OF BEDROCK BOS - BELOW GROUND SURFACE TRP - TOP OF BAND PACK

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GEOLIS Well Construction Form

)	COMPANY: _ PROJECT: _ PROPERTY:		STON Jermon J. Michiga	an st	LOCATION ID: WES-9D DATE: 2/7/2014 LOGGER: P. LANDRY
	START DATE: COMPLETION D	-40	2/8	2014	SURVEYED ELEVATIONS (MSL) DEPTH TO WATER DATE / TIME GROUND LEVEL: FT/M FT/M(TOC)
	WELL STATUS: PMP - ABN - COL - NOR STATUS DATE:				MEASURING POINT; FT/M FT/M(TOC)
	WELL DIAGRAM - N		DEPTH (FT. BG8)	WELL	WELL TYPE: SCREEN - MULT, SCREEN - OPEN HOLE - NESTED - PROBE - LYSIMETER CASING: SINGLE DOUBLE - TRIPLE COMPLETION: FLUSH PROT - VAULT - CAP - NA NUMBER OF SCREENS OR NESTED WELLS: 1 - 2 - 3 - 4 - 5 - OTH: WELL USE: DOM - PUB - IRR - FIP - MON) HYD - EXT - DEW - RCH - VEW - INJ - OTH:
0	\$ D	†(P)	0	GRS	WELL DESIGN CONSTRUCTION CASING #1: DIAMETER: IN/CM INTERVAL: To
					CASING JOINTS: FLT-BUT-EUT-SOL-WLD SCW-CAM-OTH: CASING #2: DIAMETER:
10					CASING #3: DIAMETER:IN/CM INTERVAL:TOFT/M BGS (OUTERMOST) TYPE: PVC-STN-LCS-GALSCHEDULE: 5-10-20-40-80
20			~17		STICK UP: INNER CASING:FT/M OUTER CASING:FT/M GROUT: TYPE: CMT - C/B - BEN - HSB - OTH:
20 Schen	25/1		SAND Grave		INTERVAL:TOFT/M BGS PLACEMENT: TRM-PRS GRV CENTRALIZERS: (NON-1-2-3-0TH: SEAL: **TYPE 1: Bent Chips Interval: 19 TO GR/M BGS
Bottoni 3				naskran Paskran Paskran	SAND PACK: TYPE: Med INTERVAL: 40 TO 46.5 FTM BG8
5and -	BENT.		71U 39.9	uan anon	SCREEN: DIAMETER:
screen "			SAND		SILT TRAP/SUMP: (YES)- NO INTERVAL: 45.7 to 46 FT/M BGS 3- INC
6 Bottom 5	AND 49	Discontinue de la continue de la con	46.4×		OPEN HOLE: DIAMETER 1: IN/CM INTERVAL: FT/M BGS DIAMETER 2: IN/CM INTERVAL: FT/M BGS
30	Bert Clips		7		INSIDE WELL T.D.: 46 FTI) BGS COLLAPSE/BACKFILL: COL-BFL-BTH-NON COLLAPSE INTERVAL: 46 TO 45 FT/M BGS TYPE: BENT CHIPS
60			TIU-		STRAT UNIT MONITORED: SAIND BENEATH 12 Till wit.
	654		10 65 l	**************************************	ESTIMATED WELL YIELD: GPM/LPM DRAWDOWN: FT/M BMP WELL PUMPS: YES - NO TYPE 1: FT/M BMP
70+	WELL	CONSTRUCTIO	N CODES		TYPE 2: DEPTH: FT/M BMP
2 m 2 m 2 m 2 m	RS - GROUND SURFACE PC - BOTTOM OF PROTEC BS - TOP OF BENTONITE S BR - TOP OF BENTONITE S CC - BOTTOM OF OUTER (BF - TOP OF BAND PACK	TRC TIVE CASING TET MEAL WID EATING TOC	- TOP OF SCREEN TOP OF SILT TRAF TOTAL DEPTH IN BOREHOLE TOTAL TOP OF CARRO: SELOW GROUND	BIDE WELL L DEPTH (INNER)	Centert/Bentont 6-20 ft.

GEOLIS Well Construction Form

	COMPANY:	WES			LOCATION ID: WE3-8 S/D,				
	PROJECT:	PA REG	S ST	ART	- DATE: 2/10/2014 - 2/12/14 B				
	PROPERTY:	395		VICE	19an Avelogger: G-Glowoso &				
	SITE/AREA: (V).	Vermos	1.27	diano					
	START DATE: 2/12/14			11	SURVEYED ELEVATIONS (MSL) DEPTH TO WATER DATE / TIME FT/MFT/M(TOC)				
	COMPLETION DATE:		-	GROUND LEVEL:					
	WELL STATUS: STATUS DATE:	PMP-ABI	12 20	4	MEASURING POINT; FT/MFT/M(TOC)				
	WELL DIAGRAM - NO	OT TO SCALE	DEPTH (FT. BGS)	WELL	WELL TYPE: SCREEN MULT. SCREEN - OPEN HOLE - NESTED - PROBE - LYSIMETER				
				***	NUMBER OF SCREENS OR NESTED WELLS: (1)2-3-4-5-OTH:				
	u ut 5	- 8			WELL USE: DOM - PUB - IRR - FIR - MON - HYD - EXT - DEW - RCH - VEW - INJ - OTH: Well Pairs				
	(\$) (D)	0	GRS	WELL DESIGN CONSTRUCTION CASING #1: DIAMETER:				
	PAS	4	111111111111111111111111111111111111111		(INNERMOST) TYPE: PVC-STN-LCS-GAL- SCHEDULE: 5-10-20-40-80-				
					CASING JOINTS: FLT - BUT - EUT - SOL - WLD - SCW - CAM - OTH:				
	Taylor 1				CASING #2: DIAMETER:IN/CM INTERVAL:TOFT/M BGS				
10	- Grati	/			TYPE: PVC-STN-LCS-GALSCHEDULE: 5-10-20-40-80				
	n 10				CASING #3: DIAMETER:IN/CM INTERVAL:TOFT/M BGS (OUTERMOST) TYPE: PVC-STN-LCS-GALSCHEDULE: 5-10-20-40-80				
				ii	STICK UP: INNER CASING:FT/M OUTER CASING:FT/M				
				-,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	GROUT: TYPE: CMT - C/B - 8EN - HSB - OTH:				
1230-	114 12				INTERVAL:				
25 5'	Jen (011/2)				PLACEMENT: TRM - PRS - GRV CENTRALIZERS: NON - 1 - 2 - 3 - OTH:				
Top Screen	25.5				SEAL: TYPE 1: Cement INTERVAL: 0 TO 19 FT/M BGS				
27.5				***********	TYPE 2: Bentante INTERVAL: 19 TO 43 FT/M BGS				
30-			22 14	oranieranie	mesting 43 51				
Screen 32	545 41		- 34- !		7- 45 %				
Jerican 3-	(Bottam				SCREEN: DIAMETER:INMM INTERVAL:TOFT/M BGS TYPE: PVC STAINLESS - TEFLON - CERAMIC - OTH:				
1.0	Jana		TILL	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	SLOTS: CONTINUOUS - (SLOTTED/HORIZ) - SLOTTED/VERT - FIELD CUT				
40 -	40		4).5'	ii	SLOT SIZE: 6 10 20 - 30 - 40 SLOT IN/MM				
43	580E) /ES		HAMILLER	tere in terrero	SILT TRAP/SUMP: YES - NO INTERVAL:TOFT/M BGS				
	(SCHOOL)		SUND }		OPEN HOLE: DIAMETER 1:IN/CM INTERVAL:TOFT/M BGS				
50 -	C		Gravel		DIAMETER 2:IN/CM INTERVAL:TOFT/M BGS				
50 -	(Bottom)	E CLASS	5i		AND THE PERSON OF LARDE FOR CALL AND TO ACCUSE A COLUMN TO ACCUSE A CO				
51	sand)		1		INSIDE WELL T.D.:FT/M BGS COLLAPSE/BACKFILL: COL - BFL - BTH - NON				
					COLLAPSE INTERVAL:				
60-			Till						
00			termina and		STRAT UNIT MONITORED: SAND BENEATH IT TILL STAND BENEATH IT TILL STAND BENEATH IT TILL STANDOWN: FT/M BMP				
				**********	The state of the s				
			<u>. V</u>	11/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1	WELL PUMPS: YES - NO TYPE 1: DEPTH: FT/M BMP				
70-	Torug	(D-69	(+ B45		TYPE 2:				
	WELL	CONSTRUCTION	ON CODES		SI 112 1018 = 50000 A 275-295				
	GRS - GROUND SURFACE BPC - BOTTOM OF PROTEC	TIVE CASING TOT	- TOP OF SCREEN	UP I	Sound-packed 34-25-5. Et: Bentonite				
	TBS = TOP OF BENTONITE	BTD	- TOTAL DEPTH II	AL DEPTH	25.5-120 It; cement to surface.				
	BOC - BOTTOM OF OUTER TRP - TOP OF SAND PACK	BOS	= TOP OF CASING = BELOW GROUN						
	The state of the s	The second second second							

GEOLIS Well Construction Form

	COMPANY:	WES			START LOCATION ID: WES - 7
	PROJECT:	EVHIC	20m	<u> </u>	DAIE:
	PROPERTY:	est ileans	400	150	Cana LOGGER: G. GOUSSOS
	SITE/AREA:	W. Verm		naria	SIGNATURE.
	START DATE		3/2014	d	SURVEYED ELEVATIONS (MSL) DEPTH TO WATER DATE / TIME
	COMPLETION		114/20		GROUND LEVEL: FT/M — FT/M(TOC)
	WELL STATU		BN - COL NOR)	MEASURING POINT: FT/MFT/M(TOC)
	STATUS DAT	E:			WELL THE COREEN WILL BOREEN OREN HOLE MESTED PROPERLYSIMETER
	WELL DIAGRAN	A - NOT TO SCAL	DEPTH (FT. BGS)	WELL	CARINO, CONST. POLIDIE TOIDIE COMPLETION FILIDIA PROT VALIET CAR NA
	1100	17.50			NUMBER OF SCREENS OR NESTED WELLS: 1 - 2 - 3 - 4 - 5 - OTH:
	mc ə	-7D.		**************************************	WELL USE: DOM - PUB - IRR - FIR - MON HYD - EXT - DEW - RCH - VEW - INJ - OTH:
	CFCust	MOVUUT	0	GRS	WELL DESIGN CONSTRUCTION CASING #1: DIAMETER: 2 INJOH INTERVAL:
		PD	+ 0		CASING #1: DIAMETER: NCM INTERVAL: TO FTM BG
		2.2		(,,,,,,,,,,,,,,	(INNERMOST) TYPE: PVC-STN-LCS-GAL- SCHEDULE: 5-10-20 46 80 CASING JOINTS: FLT-BUT-EUT-SOL-WLD SCW-CAM-OTH:
			111.		CASING #2: DIAMETER: IN/CM INTERVAL:TO FT/M BG
		de ce	the fun		TYPE: PVC-STN-LCS-GALSCHEDULE: 5-10-20-40-80
			710		CASING #3: DIAMETER:IN/CM INTERVAL:TOFT/M BG
					(OUTERMOST) TYPE: PVC-STN-LCS-GAL- SCHEDULE: 5-10-20-40-80-
			- weh	er e	STICK UP; INNER CASING:FT/M OUTER CASING:FT/M
			relivie		GROUT: TYPE: CMT - C/B - BEN - HSB - OTH:
- 1	100 3		- 20		INTERVAL;
	. L.C.				PLACEMENT: TRM - PRS - QRV CENTRALIZERS: NON - 1 - 2 - 3 - OTH:
	Bertinte	44			SEAL: TYPE 1: Brentonite INTERVAL: 41 TO 20 FT/M BG
	e 20	444			Can t/81-th 20 0
		4 /	- 30	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
- 1					SAND PACK: TYPE: MACHINI INTERVAL: 41 TO 50 FTAM BO
- 1		/ //	Tilla		SCREEN: DIAMETER:
- 1			34.7 ft		TYPE: PVC - STAINLESS - TEFLON - CERAMIC - OTH:
2543		TILL	40	14444.	SLOTS: CONTINUOUS SLOTTED/HORIZ SLOTTED/VERT - FIELD CUT
41,	211				
- 1	Park		THE BOT		SILT TRAP/SUMP: YES - NO INTERVAL:
SAND UNIT	45.5-48.3°		45.5		OPEN HOLE: DIAMETER 1:IN/CM INTERVAL:TOFT/M BG
50'	Botton	F-Ha-	C mostod	27 XX	DIAMETER 2:IN/CM INTERVAL:TOFT/M BGI
200	Sand				INSIDE WELL T.D.: 48 FT/M BGS COLLAPSE/BACKFILL; COL - BFL - BTH - NON
	Perck			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	COLLAPSE INTERVAL:
1		TITLE	LENZE		BACKFILL INTERVAL: TO FT/M BGS TYPE:
1					
					STRAT UNIT MONITORED: SAND GROW TO TELL STAND GROWD TO THE STAND BANDOWN: FT/M BM
				>>>>>>>	WELL PUMPS: YES - NO TYPE 1: DEPTH: FT/M BMP
	BOREFICLE	J. 7.D. 70	170		TYPE 2: DEPTH:FT/M BMP
	i i i i i	VELL CONSTRUC	TION CODES		all get land well in the
	GRS - GROUND SU	RFACE	TAC - TOP OF SCREEN		COMMENTS: John Sen deep week in the
	TBS - TOP OF BENT	ONITE BEAL	ATD - TOTAL DEPTH II	NOIDE WELL	
	BOC - BOTTOM OF	OUTER CASING	TOC - TOP OF CABING	(INNER)	The contract of the contract o
L					

WES	TON SC	DLUTIONS, INC.			Drilling/Lithologic Log PAGE 1 OF 2				
	Name	West Vern 20405.012.00			Boring No.	WES-6 Monitoring	Groundwa Date	ter Levels Depth	
	Orilled	Feb. 3-4, 2			Drilling Method	RotaSonic		<u>ा । जिल्लामा । । । । । । । । । । । । । । । । । । </u>	
Drillin		Layne-Chr		son	Completion Depth				
** **	oreman	Tom Devik			Location	Speedway, IN		<u> </u> 	
Logge	11 11 11	P. Landry/0		oussos	Drill Rig Type	Roussy Sonicor 50K		- 	
Depth	USCS	Sample	%					FID/OVA	
ft BGS	Class	Interval	Rec.		Visual	Description		HEATED HEADSPACE	
- - - 10	OL SM/SW	0-7 ft 7-9.5 ft		root mat 1.2-4.2 f sand me silt with 7-7.4 ft: 7.4-9.2 f and occa minor de	Top soil, med-dark terial common, soft, ft; Gray brown silty of define grain, fine grain angular gravel at 3.2 Orange brown clay ft: Orange medium-fasional angular grave ense silty clay lenses	brown silty clay, son damp-moist. clay with 20% sand, invel, grades to brown, 2 ft, dry. ey sand, soft moist. Fine grained sand with the (~10%), loose, dames.	10% gravel, dense sandy a some silt ap-dry,		
_ _ _	SW	9.5-12 ft	100	as/above round-st	e; loose, silty sand w	dy gravel, sub round- ith 10% gravel/cobble ad is fine-med grained	es 1/4-1/2-in		
_ 15	SW/SM	12-14 ft	100	angular-		e brown gravelly, silty 1/2-inch diam), sand			
- - -	ML GW/GM	14-16 ft	100	coarse-f depth (1 15.3-16	ine, angular-sub round 0-20%), fine-very fire ft:Poorly sorted sand to round, becoming the feet of the	gravelly silty till, 10- nded, non-plast, incress ne grained within silt, dy, silty, coarse to fin more uniform loose sa	sand at , dry. ne gravels,		
_ 20	SW/SM	16-19 ft	100	coarse s	.	ange brown gravelly s nded gravel, wet at 17			
_	SW/SM	19.5-29.5	100	coarse g 10% silt 26.5-29.	rained sand with 309 t, wet, loose. 5 ft: as/above; distin	ange brown gravelly s % med-coarse gravels nct color change to m e, 10% silt, little-trac	, loose, tr to ed-dark		

						Kelelelic		raye o
WES	TON SC	DLUTIONS, INC.			Drilling/	Lithologic Log	PAGE 2	OF 2
Job	Name	West Veri	nont	St.	Boring No.	WES-6	Groundwa	ter Levels
Job	No.	20405.012.0	01.185	56.00	Well Type	Monitoring	Date	Depth
Date	Drilled	Feb. 3-4, 2	2014		Drilling Method	RotaSonic		
Drillin	g Co.	Layne-Chr	istian	son	Completion Depth	69.5 (ft bgs)		
Drill F	oreman	Tom Devil	(Location	Speedway, IN		I I
Loggi	ed By	P. Landry/	G. Ro	oussos	Drill Rig Type	Roussy Sonicor 50K		l
Depth	USCS	Sample	%				•	FID/OVA
ft BGS	Class	Interval	Rec.		Visual	Description		HEATED HEADSPACE
30_ - - - 40 -	SW CL ML/CL SW/SM ML/CL	29.5-39.5 ft 39.1-46.1 ft		poorly s cobbles 33.7-38. gravel fl trace fin 38.9-39. 1/4-inch 39.1-43. float, me 43.7-45.	7 ft: as/above, loose orted fine-coarse san with little-10% silts. 9 ft: Very dense, graloat common, fine-coarse sand. 1 ft: as/above, with thin, dominantly clatter, as/above, dark graved-coarse gravel, med 2 ft; Silty, gravelly 1 ft: Back into dense	d with coarse to fine y-dark gray silty cla barse gravel, silty cla very thin med-coarse yey silt till, moist-day clayey, silty Till with gray sand with trace	gravels, y Till with y, moist-dry, e sand lense amp. vith gravel y. e-10% clay/silt h 10% gravel	
50 <u> </u>	ML/CL	46.1-49.1 49.1-56.1 ft		46.1-49. very der	ed-dark gray, trace find a fit: as/above, clayense, med gray, uniforme, dark gray, dense clayed dry-damp, gray	y silt till with minor m, minor to trace san ayey silt Till, minor	gravel float, ad <10%, dry gravel float	
- - 60		56.1-59.1 59.5-69.5		minor gr	e, dark gray, dense cl ravel float, rounded-a e, dense dark gray cla e gravel, angular to re ce sand.	angular gravels, medayey silt Till with gra	-coarse, dry.	
 - -					Boring T	D is 69.5 ft bgs.		

			Reference if Page 9				
STON SC	DLUTIONS, INC		Drilling/Lithologic Log PAGE 1	OF 2			
Name	West Ver	mont		ater Levels			
No.	20405.012.0	001.185	6.00 Well Type Monitoring Date	Depth			
Drilled	Feb. 13-1	4, 201	4 Drilling Method RotaSonic	1			
ng Co.	Layne-Ch	ristian	Son Completion Depth 70.0 (ft bgs)	i 1			
Foreman	Tom Devi	k	Location Speedway, IN	1			
ed By	CO 000 000 000	SSOS	Drill Rig Type Roussy Sonicor 50K	1			
Depth USCS Interval Rec				FID/OVA HEATED			
Class		11001	Visual Description	HEADSPACE			
OL CL SM SM/SW	0-5 ft 5-10 ft 10-15 ft	87	soil with plant material 1.3-2.8 ft: Red brown loamy clay with gravel float, dry 2.8-3.0 ft: Medium brown sand and gravel, dry 5-5.8 ft: Brown clayey sand with some gravel, dry 5.8-9.3 ft: Medium brown sand and gravel, dry. 10-10.4 ft: Medium brown clayey sand, some gravel. 10.4-13 ft: Medium brown sand and gravel, well sorted, no fir				
SM/SW CL SW	15-20 ft	93	15.75-17.1 ft: Gray silty clay with gravel float, dry.				
SW	20-30 ft	53	20-22 ft: Medium brown sandy gravel, wet.				
	Name No.: Drilled: ng Co.: oreman ed By USCS Class OL SM SM/SW SM/SW CL SW	No. 20405.012.0 No. 20405.012.0 Prilled Feb. 13-1 Ing Co. Layne-Cheoreman Tom Devi Ed By Greg Rou USCS Class Sample Interval OL 0-5 ft CL SM SM/SW 5-10 ft 10-15 ft SW SW	No. 20405.012.001.185 Driffed: Feb. 13-14, 201 ag Co. Layne-Christians Foreman Tom Devik ed By Greg Roussos Sample Interval % Rec. OL 0-5 ft 80 CL SM 5-10 ft 87 SM/SW 5-10 ft 80 SM/SW CL 15-20 ft 93 SW 20-30 ft 53	Name: West Vermont St. 20405.012.001.1856.00 Well Type: Monitoring Date: Drilled Feb. 13-14, 2014 Drilling Method: RotaSonic Date: Drill Rig Type Roussy Sonicor SOK Drill Rig Type Ro			

WES	TON SC	DLUTIONS, INC.			Drilling	/Lithologic Log	PAGE 2	OF 2
Job 1	Vame	West Verr	nont	St.	Boring No.	WES-7	Groundwa	ter Levels
Job 1	Vo.	20405.012.0	01.185	6.00	Well Type	Monitoring	Date	Depth
Date D	Drilled	Feb. 13-14	1, 201	4	Drilling Method	RotaSonic		
Drillin	g Co.	Layne-Chr	istian	son	Completion Depth	70.0 (ft bgs)		. !
	oreman	Tom Devik				Speedway, IN		! !
Logge	11 11 11	Greg Rous				Roussy Sonicor 50K		i
Depth	uscs	Sample	%		0 71	•		FID/OVA
ft BGS	Class	Interval	Rec.		Visual	Description		HEATED HEADSPACE
					3.00.01			
30_	SW	30-40 ft	71	30-34.7	ft: Gray brown sand	l and gravel as above,	wet.	
				34.7-37.	1 ft: Till , hard, gray	clay with gravel float	t.	
	CL							
40								
	ML/CL	40-47 ft	100	40-43 ft:	as/above, dense Ti	ll, Dry		
	0111/03 -							
	SW/SM							
	ML			43-45.5	ft: clayey gray brow	n silt, moist, soft.		
	SW/SM					l, well sorted, little gra	avel, wet	
	SM	47-50 ft	100	47-48 3	ft: As/above well so	orted sand and gravel,	wet	
50	ML/CL	., 2010			·	Till, dry, some-minor		
	ML/CL	50-56 ft			ft: Dense Till as/abo			
	SM				7 ft: Gray sand lense			
				33.7-30	ft: Dense, gray Till	as/auove.		
	ML/CL	56-60 ft	100	56-60 ft:	same as/above, der	nse, medium gray Till,	, dry.	
						-		
60								
	ML/CL	60-64 ft	100			ense, gray Till with so	me	
				gravel fl	oat, very dry.			
	ML/CL	64-70 ft	100			ense, gray Till, clayey		
				minor gr	avel float, thin 1-inc	ch clayey sand lense at	t 64.25 ft.	
					Rovina 7	ΓD is 70 ft bgs.		
					DOTHING I	ra io io it ngo.		

						Kelerence		age ii
		DLUTIONS, INC.			<u>_</u>	/Lithologic Log		OF 2
	Name	West Verr			Boring No.	WES-8		ter Levels
Job I	Vo.	20405.012.0	01.185	6.00	Well Type	Monitoring	Date	Depth
Date I	Orilled	Feb. 10-11	l, <mark>201</mark>	4	Drilling Method	RotaSonic		!
Drillin	g Co.	Layne-Chr	istian	son	Completion Depth	69.0 (ft bgs)		I I
Drill F	oreman	Tom Devik	(Location	Speedway, IN		I I
Logge	ed By	Greg Rous	sos		Drill Rig Type	Roussy Sonicor 50K]
Depth	uscs	Sample Interval	% Rec.					FID/OVA
ft BGS	Class	interval	Nec.		Visual	Description		HEATED HEADSPACE
_	OL	0-5 ft	80		:: Medium brown cl :: Medium brown sa	ay , some gravel, trace and and gravel, dry	e sand, damp	
_	SM/SW	5-9 ft	92		Medium brown sand avel at 9 ft.	& gravel, damp-dry,	grades to	
10 <u> </u>	SW/SM CL	9-15 ft	61	9-12 ft:	as/above to 12 ft, be	ecoming orange in col	or.	
-				12-12.66 moist	5 ft: Medium gray si	i lty clay with minor g	ravel float,	
15 <u> </u>	SM/SW CL	15-20 ft	100		Medium gray sand	nyey sand & gravel, d I y gravelly clay , dam	_	
_	SW				: Medium brown sarwith depth.	nd & gravel, wet, sand	d becoming	
20 _	SW	20-30 ft	72	20-27.25	5 ft: Medium gray sa	and & gravel, trace c	lay, wet	

WFS	TON SC	DLUTIONS, INC.		Drilling/Lithologic Log PAGE 2	OF 2
	Name	West Verr			ater Levels
Job I		20405.012.0			Depth
	Orilled	Feb. 10-11		[1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	
Drillin		Layne-Chr		0101010101010101010101	!
11 11	oreman	Tom Devik		Location Speedway, IN	I I
Logge	13 13 13	Greg Rous	ssos	Drill Rig Type Roussy Sonicor 50K	1
Depth	uscs	Sample	_%		FID/OVA
ft BGS	Class	Interval	Rec.	Visual Description	HEATED HEADSPACE
30_	SW	30-40 ft	88	30-32.7 ft: same as/above, gray sand & gravel.	
- -	CL			32.7-37.25 ft: Till , greenish gray, silty clay with minor gravel float, dry	
40	ML/CL	40-46 ft	92	40-41.5 ft: as/above, Till . Dry	
	WIL/CL	40-40 10)2	70-41.5 it. as/above, 1111. Dry	
	SW/SM			41.5-43.5 ft: Fine to medium grained sand grading to coarse	
	ML			sand, medium brown, wet. 43.5-43.9 ft: medium gray Silt lense with minor fine gravel,	
	SW/SM			43.9-45.5 ft: Medium gray fine to coarse sand with gravel,	
	SW	46-50 ft	90	wet. 46-49.6 ft: same as/above, medium gray fine to coarse sand	
_	2 W	40-30 10	90	with some gravel, wet.	
50	ML/CL	50-55 ft		50-51 ft: as/above, sand with gravel, medium gray, wet. 51-55 ft: Till , hard, medium gray clayey silt, damp, gravel float.	
_	ML/CL	55-60 ft	100	55-60 ft: same as/above, dense, medium gray Till, clayey silt, little to trace fine gravel float, dry	
60 <u> </u>	ML/CL	60-64 ft	100	60-64 ft: same as/above. Dense, gray Till, clayey silt with minor gravel float.	
	ML/CL	64-69 ft	100	64-69 ft: same as/above. Dense, gray Till, clayey silt with minor gravel float. Boring TD is 69 ft bgs.	

						Reference	<u> </u>	age 13
WES	TON SC	DLUTIONS, INC.	1		Drilling	/Lithologic Log	PAGE 1	OF 2
Job	Name	West Ver	mont	St.	Boring No.	WES-9	Groundwa	ter Levels
Job	No.	20405.012.0	01.185	56.00	Well Type	Monitoring	Date	Depth
Date	Drilled	Feb. 6-7,	2014		Drilling Method	RotaSonic		
Drillin	ng Co.	Layne-Ch	ristian	son	Completion Depth	65.0 (ft bgs)		:
	oreman	Tom Devil	Κ		Location	Speedway, IN		i i
Logg	ed By	P. Landry	F. Be	odray	Drill Rig Type	Roussy Sonicor 50K		!
Depth	uscs	Sample Interval	% Rec.		·			FID/OVA
ft BGS	BGS Class				Visual		HEATED HEADSPACE	
- - - 10 - -	OL SM/SW SW/SM MI	0-5 ft 5-7.5 ft 7.5-10 ft 10-13.5	100 100 100	plant and 1.5-5 ft; increase 5-7.5 ft: as above 7.5-10 ft loose, dr 10-10.3 10.3-11. 11.5-13. sorted, r	Top soil, med-gray d root material, unifor Medium gray brown d sand and fine grave Medium brown silty e grading to silty sand t; Orange brown silty ry. ft: as/above, silty sand 5 ft: Orange brown, 5 ft: Loose gravelly round-angular gravel 7 ft: as/above, grave	brown clayey silt, littorm, damp-moist. In clayey silt as above el at 3.2 ft, dry-damp, y clay with 20% sand d & gravel at 6.9 ft, power and with gravel. In clayey silt as above el at 3.2 ft, dry-damp, y clay with 20% gravel at 6.9 ft, power and with gravel. In dwith gravel, dense silt with gravel sand, fine to coarse gravel with 20% silt and tracelly sand.	with soft , 10% grav corly sorted el, 10% silt, ravel, poorly ce clay.	
15 _ _ _ _ 20	ML SW	18-20 ft	0	gravel is 14.4-18 well sort	angular, soft, damp	elly sand, 80% loose		
-	SW/SM	20-30 ft	100	poorly so 24.5-30	orted, fine-coarse gra	ravelly sand as above, ained, gravel 20%, litt rk gray gravelly sand	tle fines.	

WES	TON SO	DLUTIONS, INC.			Drilling	/Lithologic Log	PAGE 2	OF 2		
	Name	West Verr		St	Boring No.					
Job I	10 10 10	20405.012.0			Well Type	Monitoring	Date	Depth		
	Orilled	Feb. 6-7, 2			Drilling Method	RotaSonic	[0.040.039.040.040		
Drillin		Layne-Chr		son	Completion Depth					
1	oreman	Tom Devik			Location	Speedway, IN				
Logge		P. Landry/		odrav		Roussy Sonicor 50K				
Depth	USCS	Sample	%		<u> </u>	•	<u> </u>	FID/OVA		
ft BGS	Class	Interval	Rec.		Visual	Description		HEATED HEADSPACE		
30_ - -	SW CL/ML	30-39 ft	100	31-34.5 grades t 34.5-39 float, m top of ti	ft: loose sand with 8 o coarse gray sand w ft: Dense, gray Till ed-dark gray, minor ll was moist grading	med-coarse sand, 10% 10% gravel, trace silt, with 20-30% fine-coarse, clayey silt with trace intermittent fine-med to damp-dry within to the depth, gravel float	poorly sorted, se gravel. e crse gravel sand (10%), op 1-2 ft, clay			
40										
40	ML/CL	39-49 ft	100	39-39.9	ft: as above, dense	clay silt till with grave	el float, dry.			
	1,12,02	65 15 10				gray, uniform Sand, w				
	SW/SM				dominantly med grained with some fine grained sand, grades to coarse sand at 44.4 ft.					
_	ML/CL			46.4-49 fine gra						
_ 50	ML/CL	49-58 ft		med-fin	•	ay silty clay till , dam /4-inch fine-med sand				
- - - 60 -	ML/CL	58-65 ft			med gravel, angul	dark-med gray silt ar-sub rounded, dry.				
_										

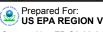
Reference 17 Page 15 MW-WES-08S

MW-WES-08D MW-WES-09S + MW-WES-09D MW-WES-06S

MW-WES-06D MW-WES-07



Well Location



Contract No.: EP-S5-06-04 TDD: S05-0001-1205-013 DCN: 1856-2A-BBKP

Prepared By: WESTON SOLUTIONS

2501 Jolly Road Suite 100 Okemos, MI 48864

Layne Drilling Well Locations Completed February 2013

N) Completed February 2013

West Vermont Street
Speedway, Marion County, Indiana